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ABSTRACT

The relationship between intrinsic motivation for school learning and school achievement was investigated. An intrinsic motivation inventory was developed to test the hypotheses that intrinsic motivation is differentiated into specific subject areas for school learning; and for specific subjects is positively, significantly, and differentially correlated with achievement in corresponding subject areas. A self-report inventory, measuring pleasure inherent in school learning within subjects, was administered to fourth and seventh graders and correlated with their Stanford Achievement Test scores. Results supported the predictions, suggesting that intrinsic motivation for school learning is differentiated by subject area and that intrinsic motivation within specific subjects is a significant component of school achievement beyond the variance attributable to IQ. The intrinsic motivation inventory proved to be reliable and valid. (Author)

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Role of Intrinsic Motivation in Children's School Achievement

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Role of Intrinsic Motivation in Children's School Achievement

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Intrinsic motivation for school learning should be positively related to school achievement. Intrinsic motivation, or the motivation in which pleasure is derived from performing an activity for its own sake without receipt of apparent external rewards (Deci, 1975) has received an increasing amount of attention as an influential factor in learning and performance (Deci, 1975) as research indicates that extrinsic reinforcers can have a deleterious effect on learning and performance in some instances (Condry, 1977). Theoretical conceptions all advance the view that intrinsic motivation results from cognitive activity itself, not from extrinsic sources, and that intrinsically motivated cognitive activity is pleasurable (Berlyne, 1966, 1978; Hunt, 1971; White, 1959). According to Berlyne (1966; 1978) conceptual conflict results when an individual is exposed to collative stimuli (e.g., novel or incongruous). The individual seeks to reduce this discomfort through specific exploration, of which curiosity is an example. An individual also seeks to increase exposure to collative stimulation when bored, through diversive exploration. Hunt (1971) advanced an information processing model of intrinsic motivation in which incoming information at an optimal level of discrepancy from existing cognitive structures produces cognitive change that is intrinsically motivating. White (1959) proposed that the desire to master the environment, or competence motivation, causes the individual to seek stimulation, or arousal, rather than drive reduction. The educational implication from these theories is that school learning ought to be intrinsically motivating because of the opportunity it affords to master the environment, engage in specific and diversive exploration, and encounter optimally discrepant stimuli. While much evidence has been garnered supporting the existence of intrinsic motivation (Berlyne, 1978; Condry, 1977; Deci, 1975; Harter, 1978) the research has concentrated on laboratory and experimental studies with little relevance to actual school learning. The present research fills this gap by studying intrinsic motivation for school learning and its relationship to school achievement. The goal of this research is to show that intrinsic motivation for school learning is positively related to school achievement.

In the present research, to study the relationship between intrinsic motivation

and school achievement, an intrinsic motivation self-report inventory was developed based on the theories of Berlyne, Hunt, and White. In developing this inventory, the present author considered intrinsic motivation to be differentiated according to specific subject areas and it was not considered to operate in a unitary trait-like fashion. This nontrait approach was adopted based on: (a) nontrait conceptions of personality advanced by Mischel (1973); (b) evidence demonstrating that even visual exploration is differentiated according to specific stimuli (Hutt, 1970; Rump, 1968); and (c) theoretical propositions (Deci, 1975; Harter, 1978) that intrinsic motivation is a differentiated construct.

It is hypothesized that: (a) intrinsic motivation for school learning is differentiated into specific subject areas, and (b) there is a positive relationship between intrinsic motivation for learning in specific subject areas and actual achievement in those corresponding areas. In the present paper, evidence will be presented which supports both hypotheses and which elucidates the role of intrinsic motivation in school achievement. Reliability and validity of the inventory is also presented.

Method

Subjects: Participants were 77 fourth- and 64 seventh-grade, white, middle-class children attending public school in a suburban school district. Boys and girls were evenly represented at both grade levels. All children participated with parental permission.

Intrinsic Motivation Self-Report Inventory: Items were based on the theories of Berlyne, Hunt and White and therefore were formulated to measure mastery, specific and diversive exploration, pleasure derived from school learning, interest in novelty, challenge and persistence. Furthermore, these aspects of intrinsic motivation were differentiated by subject area (reading, math, social studies, and science). Several general intrinsic motivation items (not differentiated by subject area) were also included for comparison purposes. Children responded to each item along a 5-point Likert scale ranging from Strongly Agree (1) to Strongly Disagree (5). An example of an item differentiated by subject area is: "I enjoy learning new things in: reading, math, social studies, science." The child answered the item separately for each

subject area. An example of a general item is: "I feel good inside when I know I have learning something new." A total of 38 items were included.

A number of items were also included to assess children's consistency in responding, and response acquiescence tendencies. Wording of items was varied to discourage response sets. Some additional items were administered to the children to assess their anxiety in the specific subject areas so that the relationship between intrinsic motivation and anxiety, predicted to be a negative one, could be determined. An example of an anxiety item is: "I feel worried when we learn new things in class in: reading, math, social studies, science" to which the child responded along a 5-point Likert scale for each subject separately.

Achievement: Otis-Lennon IQ and Stanford Achievement Test, Form A, scores in the areas of reading, math, and auditory (an oral vocabulary and listening comprehension test) were available for the fourth and seventh graders. All children received these tests concurrently with the administration of the Intrinsic Motivation Self-Report Inventory. Fourth graders were also retested on the SAT six months after having been administered the Intrinsic Motivation Inventory.

Procedure: Children were individually administered the Intrinsic Motivation Inventory. Instructions and items were read aloud to the child. All procedures were standardized, including instructions. The intrinsic motivation inventory was readministered after a two-month interval to assess retest reliability.

Results

Both hypotheses are supported. Intrinsic motivation is differentiated into specific subject areas, and there is a positive relationship between intrinsic motivation for specific subject areas and achievement in those areas.

For the analyses, the inventory was divided into the following subscales: reading, math, social studies, science, general, and a total scale which was the sum of the preceeding scales. The subscales were composed of the relevant items pertaining to that area. Internal consistency reliability was assessed using coefficient alpha and showed that the subscales and total scale show considerable homogeneity. Coefficient alphas for the grades combined are: .71, .71, .73, .69, .75, and .82 for the reading,

math, social studies, science, general, and total scales, respectively. Coefficients for the fourth and seventh grades considered separately were quite similar to those presented for the grades combined. Test-retest reliability was moderate with subscale coefficients ranging from .50 to .70, all significant.

For the validity analyses, each of the motivation subscale scores was correlated with SAT scores in reading, math, and auditory areas. IQ was partialed out of these correlations because it was considered important for a measure of motivation to correlate uniquely with achievement beyond the variance attributable to IQ. All of the partial correlations reported below are significant at $p < .05$ and better. Intrinsic motivation subscale scores were correlated with the SAT grade equivalents, percentiles, and scaled scores in the three areas. Positive correlations indicate that higher intrinsic motivation scores are related to higher achievement scores, and lower intrinsic motivation scores are related to lower achievement.

Intrinsic motivation in reading correlates significantly with reading and auditory achievement, but not with math achievement, as predicted. For fourth graders on the first achievement test, the correlations between reading motivation and auditory achievement are .30, .25, and .38 for the grade equivalent, scaled score, and percentile, respectively. On the second achievement testing, reading motivation and achievement correlate at .20 and .25 for the vocabulary and reading comprehension subscale and percentile scores, respectively. For seventh graders, the correlation between reading motivation and achievement is .23 for the total scaled score.

The math intrinsic motivation subscale correlates specifically and significantly with math achievement. For fourth graders' first achievement testing, the correlations between math motivation and achievement are .31, .31, and .23 for the grade equivalent, scaled score, and percentile, respectively. On the second achievement testing, correlations are .28, .41, and .35 for the math concepts, math computation, and total math score grade equivalents. For seventh graders, math motivation and math achievement correlate at .30 for the scaled score. Math motivation scores do not relate to reading or auditory achievement, as predicted. Further, the reading and math intrinsic motivation subscales were uncorrelated, $r = .02$, indicating that they each

measure separate components of intrinsic motivation supporting a differentiated view of intrinsic motivation.

The intrinsic motivation subscales in the subject areas of social studies, science, as well as the general and total scales, did not relate to achievement. These results further support a nontrait, specificity account of intrinsic motivation.

Multiple regression analyses were conducted for the fourth and seventh graders combined. With the total math grade equivalent as the criterion measure, the intrinsic motivation math subscale proved to be a significant predictor, $p < .05$, in addition to IQ and grade level. Sex was not significant. Hence, intrinsic motivation in math may be used as one of several predictors of math achievement.

Other analyses showed that there is a significant negative relationship between intrinsic motivation in reading and math with anxiety in reading and math, respectively, as predicted. Therefore, children who report higher levels of intrinsic motivation in these areas also report lower levels of anxiety, and vice versa. The general intrinsic motivation scale did not relate to anxiety. These results lend construct validity to the Intrinsic Motivation Inventory because, theoretically, those who enjoy learning should show less anxiety than those who do not. These results further support the differentiation of intrinsic motivation into specific areas.

Analyses also showed that the children answered consistently with the absence of response acquienscence. There were no sex differences in the results.

Conclusions

This research provides evidence that intrinsic motivation is a significant component of school achievement, and a reliable and valid method of measuring intrinsic motivation in children has been developed. Intrinsic motivation is differentiated by specific subject areas, and these areas relate specifically, differentially, and positively to corresponding achievement areas. These results were obtained for the areas of reading and math. Hence, intrinsic motivation is not a general trait. Supportive of these conclusions is the differential validity found for the reading

and math motivation subscales, and the lack of relationship between the general and total scales with achievement. The research further indicates that intrinsic motivation has a unique relationship to achievement, separate from the contribution of IQ.

The present research indicates that children reporting lower levels of intrinsic motivation in reading and math also show lower levels of achievement in those respective areas as measured by a standardized achievement test compared to children reporting higher levels of intrinsic motivation. The educational importance concerns the potential applicability of the Intrinsic Motivation Inventory to classroom teaching. Children's levels of intrinsic motivation in specific subject areas could be identified for the purpose of planning motivational-educational interventions specifically suited to each child's pattern of intrinsic motivation. The purpose of such interventions would be to enhance both intrinsic motivation and achievement in certain areas. This application necessitates further experimental research to determine whether intrinsic motivation is a causal factor in achievement, whether intrinsic motivation may be modified, and whether a change in intrinsic motivation will result in improved achievement. The Intrinsic Motivation Inventory can be used in this research as an independent assessment and as a dependent measure for examining pre- to postintervention changes in intrinsic motivation. I am planning a research program to study these issues.

The Intrinsic Motivation Inventory is currently being administered to a larger and more diversified population of children which includes additional grade levels, ethnic groups, and social classes to expand the applicability of the research.

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